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The resolution of the legislature of New York calling for information from Railroads, is given below. This movement will procure the annual publication of a series of returns, similar to those made to the Massachusetts legislature, and which have materially influenced the character of railroads by presenting in a condensed form the *accurate* results of each years' operation—which results have uniformly proved highly favorable to the reputation of railroads. Viewed in this light we may pronounce this an important step in the progress of railroads in our State.

STATE OF NEW YORK. IN ASSEMBLY, FEBRUARY 2, 1843.

On motion of Mr. Hathaway—*Resolved*, That the several railroad companies in this State be and are hereby required to make their annual reports to the Secretary of State, by the first day of February in each year, which reports shall embrace the business of the preceding year to the first day of January, and shall state the length of their road in operation; cost of construction; income from passengers, from freights and from all other sources; the number of through and way passengers, and the receipts from each class; their expenses for repairing and running the road and for construction, which two items shall include all their expenditures; the amount of dividends; the number of locomotives; of passenger, freight, mail and other cars; the number of machine shops; the number of horses; the average number of men in the employment of the company; the number of miles run by passage trains, by freight and all other trains; and that the Secretary of State be requested to put such information in a tabular form, and prepare it and the reports in one document, for printing, for the use of the legislature.

Resolved, That the Secretary of State be requested to communicate the foregoing resolution to the Presidents of the several Railroad companies in this State. By order. H. N. WALES, *Clerk*.

State of New York, Secretary's office. I certify the above to be a true copy from the original on file in this office.

(Signed,) S. YOUNG, *Secretary of State*.

The proceedings of the Railroad Convention lately held at Albany, are deserving of notice in the pages of this Journal, as showing a design to ac-

commodate the public by frequent trains and low fares. An attentive examination will show no spirit or disposition to anything improper

At a meeting of Delegates from the several Railroad companies between the Hudson river and Buffalo, held at the American hotel at Albany, on the 31st day of January, 1843, pursuant to notice, H. B. Gibson was apointed president, and Charles Stebbins, secretary.

The following Delegates appeared, viz:

Attica and Buffalo—H. Hawkins, V. R. Hawkins, J. P. Veeder.

Tonawanda—H. J. Redfield, Jona. Child.

Auburn and Rochester—H. B. Gibson, J. Fellows, D. S. Skaatts, Chas. Seymour, Robert Higham.

Auburn and Syracuse—G. B. Throop, T. Y. Howe, Jr., E. Williams.

Syracuse and Utica—J. Wilkinson, Holmes Hutchinson, A. Burt, C. Stebbins.

Utica and Schenectady—E. Corning, L. Benedict, W. C. Young.

Mohawk and Hudson—S. Stevens.

Troy and Schenectady—R. P. Hart, and B. Marshall.

Resolved, That Mr. Weld of Boston, be invited to attend this convention as an honorary member.

Resolved, That a committee of one from each delegation be appointed by such delegations to report upon the subjects to be acted upon by this convention and that such committee report at 3 o'clock, P. M.

The following committee were appointed, H. Hawkins, J. Child, H. B. Gibson, T. Y. Howe, J. Wilkinson, L. Benedict, S. Stevens, R. P. Hart.

The following resolutions were reported by the committee and adopted by the convention.

1. *Resolved*, That it is expedient to run the daily lines between Buffalo and the Hudson river connecting with the morning and night boats on the Hudson river out of Albany and Troy and that each line be run in 25 hours, including stops and that the same be apportioned as follows:

Buffalo to Rochester 6 hours—Rochester to Auburn 6 hours—Auburn to Syracuse 2 hours—Syracuse to Utica 4 hours—Utica to Albany and Troy 7 hours—25 hours; and that the time of starting from each end of the road for the two trains be as follows:

Buffalo	6 A. M.	Albany and Troy,	6 A. M.
"	4 P. M.	Schenectady,	8 A. M.
		Albany and Troy,	7 P. M.
		Schenectady,	9 P. M.

2. *Resolved*, That passengers ought to be allowed to pay their fare and direct their baggage to such places upon the route as they may deem proper, and that the superintendent of the several roads be directed to devise and execute a system to carry out this resolution under the executive committees of their roads.

3. *Resolved*, That baggage masters be employed at the joint expense of the several companies between Albany and Buffalo, to accompany each train and ticket and take charge of baggage between those points, who shall be paid by each company in proportion to their length and amount of receipts, and that the details of the plan to carry out this arrangement be referred to the superintendents of the several roads.

4. *Resolved*, That it is expedient that the car houses on the line between the Hudson river and Buffalo, inclusive, should be closed, and the passengers relieved from the press and inconvenience of being crowded, in the several car houses by persons who may resort there from curiosity.

5. *Resolved*, That it is expedient that a third run be made between the Hudson river and Buffalo, leaving the Hudson river at 10 o'clock P. M., and Buffalo at 12, noon, at uniform prices of 2½ cents per mile for one description of cars, and 1½ cents per mile for emigrant cars, and that it be referred to the superintendents of the several roads, under the direction of the executive committees, to arrange the arrivals and departures at the intermediate points on the line, and other matters in connection therewith.

6. *Resolved*, That the superintendents of the several companies, under the direction of the executive committees, devise and carry into effect a system of taking fare through the line, each way, for all the trains, of conveying and ticketing baggage, and such system for securing the emigrant travel as may be necessary.

7. *Resolved*, That a committee of one from each company be appointed by the delegates now present, to consider and digest a plan of stocking the passenger, baggage and freight cars, on the line between Albany and Rochester; and ultimately, when the line is completed, to Buffalo; and report the same to their several companies for consideration.

8. *Resolved*, That during the winter months, the train shall leave Buffalo at 7, A. M., and reach and remain over at Syracuse; and leave Albany at 9, A. M., and stay over night at Auburn; so that the passage between Albany and Buffalo may be made in two days, and that it be referred to the superintendents of the several roads, under the direction of the executive committees, to carry this out, and this to take effect on Monday, the 6th February instant.

9. *Resolved*, That a copy of the proceedings of this meeting be furnished to each company.

10. *Resolved*, That the two first lines commence on the 15th of March next, and the third line on the opening of the canal.

11. *Resolved*, That the several companies should be responsible to each other for all money received by their respective receivers, who are severally appointed by such companies.

12. *Resolved*, That the several companies upon the railroad line will not employ persons in the business of transportation who ever drink intoxicating liquors.

13. *Resolved*, That this convention deprecate the practice of employing runners at a distance from the respective railroads as destructive to the interests of the stockholders and vexatious to the travelling public, and that so far as in our power, we will use our influence against any company who shall hereafter employ any runner or agent at any other place than on the line of the road, at or near their depot.

14. *Resolved*, That the superintendents of the several roads be specially charged with the duty of giving extensive circulation by publication as may be deemed necessary, of the times of running such train and the prices between Albany and Buffalo, through the United States, at the expense of the several companies, in proportion to their length and amount of receipts, and that the proceedings of this convention be published in the papers of this city.

The convention adjourned without day.

H. B. Gibson, *President.*

C. Stebbins, *Secretary.*

LEGISLATIVE INTERFERENCE WITH RAILROAD MANAGEMENT.

A bill relative to railroads, having been reported in the legislature of this State, which seems to us one of the most monstrous absurdities of the day,

we have thought proper to place upon record our sentiments, although we entertain no doubt as to the ultimate fate of the measure.

The report and bill seem to be founded upon petitions setting forth the suspicion of a hideous combination between certain railroads, to cheat the *people*, to play into each others hands, and finally, to do something dreadful —we do not exactly know what, but the report appears to apprehend the subversion of the State government.

The main points of the report are as follow:—All combinations of *natural persons* are suspicious; when the rights of others are to be, or *may be* injuriously affected, they are illegal.—Corporations are not exempt from the liabilities of individuals. Then follows an illustration, drawn from monied institutions, which would equally apply to temperance societies.—Moreover railroad companies can give free rides to Editors, Judges and Legislators, and so bribe them. The use of motive power, etc., belonging to one company, on the road of another, forms a "union of strength and power which cannot be controlled, and is beyond the reach of every legitimate power known to the government." The gullability of the travelling public, is such, that they may be induced to purchase tickets for a road over which they do not desire to travel. Passengers may be "*seduced*" even from the decks of canal boats.

To obviate all these evils, the bill proposes to enact, that the fare prepaid for any road may be demanded back within 20 minutes after arriving at the end of the previous road; that whenever two roads unite, in all cases, a stop of 30 minutes must be made; that equal facilities (?) be granted by every railroad between the Hudson river and lake Erie, to every other railroad, for the purpose of procuring, carrying and transporting passengers, etc.; that there shall be admitted to the car house of each company two runners of any railroad, steamboat, packet boat or stage line; but that these runners shall not, under the penalty of a misdemeanor, solicit passengers!!! The bill further provides, that every car for passengers shall have glass windows —be lighted by night, and have "*comfortable cushioned seats with cushioned backs*"—that these cars shall always be run in the rear of every baggage, freight, or mail car. It finally provides that each company shall use none but its own cars, motive power, etc., under the penalty of $200.

Such are the provisions of the bill, which might be styled, a bill to interfere with railroad management—to incommode travellers—to patronise runners—to prevent the transportation of emigrants, and "to give every thing to every body."

Since our examination of this document, we have received the remonstrance against it by the companies on the line, from Schenectady to Buffalo. There is much good sense in this paper, and we give below, several passages which show the folly of any interference, although there are many points upon which we hardly think any argument need have been offered, unless to rebut absurd charges. We are averse from meddling with the politics of these matters, but we certainly hope that such proceedings may here-

after be rare, both for the safety and comfort of the travelling public, as well as for the credit of our State.

"The term monopoly has become of very general use and application, and is quite common in respect to railroads. When a measure, an improvement, or in short anything, is objected to because it is a monopoly, it may be well to consider whether its being so is a part of its nature, and essential to its continuance, or whether it can be divested of this feature and still be useful, available, or capable of existence.

It is the law, or a grant, that gives a monopoly character, if anything does. Now we suppose that no law can relieve a railroad in this respect, unless it destroys it. We doubt not, that all those who object to railroads, as monopolies, do not urge this because they wish all railroads destroyed, but from a want of reflection. The railway including its motive power, passage and freight property, is altogether a single machine or power; and it is as impossible for any foreign association or individual to come in and use it, as they or he please, as for two different sets of men to manage a steamboat at the same time, each resolved to go their own way. A single power and policy is necessary to control and operate a railway successfully.

To object to it therefore, because it is a monopoly, is either saying, that the individual making the proposition ought to come in and have his way upon it, and thus for the time be himself the monopolist, or that the thing itself should be abandoned because he cannot have what he conceives to be his share in the monopoly."

"The great bulk of the capital of railroad companies is invested in the road-bed and the tracks, where it remains incapable of transfer, and only productive by having the largest amount of business done over it. Several companies, upon the same line of railway, must necessarily manage in harmony; or the use of the line, to the public, is lost. This is so unlike the operation of moneyed or other corporations, that, to deduce the power, or the danger of their uniting *their* capitals, because the several companies upon the railroad line from the Hudson river to Buffalo, by acting in harmony, seek to make the passage in 25 hours, must be by a course of reasoning too attenuated for ordinary comprehension. To denominate the measures which railroad companies, upon a continuous line, must adopt as combinations, or confederacies, is such a misapplication of terms as want of knowledge, or the rival feelings of competing lines can only account for.

The application of such terms to this railroad line may be made with equal force against the arrangements from Albany to Boston, or to the New York and Erie railroad, or to the forwarding lines from Chicago to New York; in short, to every line of transportation through the country. Why can property be carried proportionably cheaper from New York to Chicago, than it can for short sections upon the same route? We suppose that it is entirely on account of the connected arrangement that is made."

"The railroad companies are under great responsibility in their business, for the proper care of the persons and property of their passengers, and they have found that to produce the largest accommodation they must adhere to rules, which may sometimes seem to be unfavorable to individuals, but which experience has shown are salutary. It requires skill, and a thorough knowledge of the business, to operate an important line of railroads."

"Although the bill alluded to does not propose to require the baggage to be overhauled at each termination, yet it contains provisions which may make that necessary in the most inconvenient manner. As the trains run day and night during the business season, some of them arrive at all the large towns

during the night, and at such arrivals very few of the passengers wish to leave the cars, and still fewer desire any arrangement that turns out their baggage or subjects them to the necessity of looking for it.

"It requires at all times great care to keep the baggage from being left or from going astray, and all the arrangements as to the baggage have for their first object security.

The large towns and all the lines of communication are known to be constantly infested with pickpockets and vicious persons who are continually depredating upon travellers, who would enjoy a harvest if at every arrival at a car house the baggage of passengers may be overhauled and they are to seek new seats. Suppose such a person in the train and he has his baggage put at the bottom of a wagon or car by design, and on his arrival at some convenient place he demands it; all the baggage must be taken out to find his, and in the mean time (for it will likely be night,) one or more trunks are stolen as he had designed should be the case. Usually it takes several cars to hold the baggage, generally not less than three; and if these are to be unloaded in the night in the presence of all who choose to mix with the passengers, it has been, as it always will be, found to be impossible to avoid difficulties resulting from accident or design. In all such cases travellers do not feel safe, for the reason that experience has shown that they are not so.

Suppose under the power which the bill professes to give him, that a pickpocket shall demand his baggage, and while searching for it that a trunk is stolen, (most likely by an accomplice,) shall the railroad companies bear the loss?"

"If the railroad companies are left free, as to the employment of runners or such agents, they will not employ them, but if they are to be licensed or recognised by law, as an appurtenant to the passage business, it would almost seem that all parties, in self defence, must employ them."

"A single suggestion as to a matter not strictly germain to the question involved, but brought in aid of the restrictions proposed in the bill, will close our memorial. It is urged that other competing lines, by a payment of tolls on passengers, are a source of revenue to the State. It would give the argument greater force if the State had not constructed, and did not keep in repair, the avenue in which their passage business is done. In short, if the State did not furnish the capital mainly for one mode of competition, and leave the other to individual contribution.

The railroad companies enjoy no immunity from taxation. The assessment rolls, the highway commissioners' lists, and the school district records in every town through which the railroads extend, will show how fully they share in the public burthens. It would be much to their interest to pay a toll on passengers equal to that paid upon the canal, and be exempted from other taxation. To impose a toll without such an exemption, would be perhaps more in the light of a bonus than otherwise.

In some towns the railroad companies pay a large share of the whole taxes, because a great amount of capital may have been expended there in cutting through ledges of barren rocks, or in crossing a deep morass. In some school districts they pay the largest part of the taxes for building houses and maintaining schools.

We entertain much confidence that the towns through which the railroads extend will not raise the objection that they pay less than their fair share of taxes.

RAILWAYS AND CANALS IN ENGLAND.

Herapath's Journal and Railroad Magazine, of 4th February last, contains "the railway and canal traffic returns of England, compiled from offi-

cial sources," in tabular form, and presents some facts highly interesting to the friends of internal improvement.

The number of railways completed and in operation in Great Britain, stated in the table, is 39, and their length, 1456 miles. The capital and loans authorized for their construction, is £55,576,976. The amount actually expended, is £52,290,024—equal to $261,450,120, or nearly $180,000 per mile.

All the main and long lines of railway, in England, without exception, pay dividends of from 1 to 10 per cent., keeping themselves in perfect order, with a "reserved fund" for this object. The short roads do not pay dividends in the same proportion. This is owing in a great measure, to their extravagant cost. The London and Greenwich railroad, 3¾ miles in length, cost $4,954,000, or $1,311,000 per mile, and divided 1¼ per cent. per annum.

The London and Blackwell railroad of the same length, cost £1,071,715, or $1,418,400 per mile, and divided the last year 2 per cent., on this immense outlay.

Name of Railway.	Miles.	Cost.	Cost per mile.	Value of Stock.	Dividends.
Great Western,	118½	£ 6,350,000	£54,529	93 per cent.	6 pr.ct.
Liverpool and Manchester,	31	1,438,654	46,408	192 "	10 "
London and Birmingham,	112½	5,832,254	51,842	212 "	10 "
Grand Junction,	97½	2,273,344	21,704	200 "	10 "
Stockton and Darlington,	43½	2,000,000	46,000	255 "	7½ "
Dublin and Kingston,	6	340,000	56,710	100 "	5 "
Manchester and Leeds,	6	2,913,000	57,120	100 "	5 "
	414	£21,147,252	£52,021 average.		

The cost of these roads is to be attributed, mainly, to the reduction of their grades to as near a level as the nature of the country traversed will permit. This rule is now to a great extent abandoned. The right of way, with legal and parliamentary expenses, also the embelishment to depot warehouses etc., are items of greater expense than in this country.

The seven railways above enumerated, yield the best returns. The other 32, costing £31,142,776, vary in their dividends, from 1 to 6 per cent., and are generally short roads.

It would appear that 414 miles of railway in Great Britain, has cost $250,000 per mile, or equal to three times the cost per mile of the 4000 miles of railroads completed in the United States. The average cost of the continuous line of 625 miles of railroad from Portland in Maine, to Buffalo or lake Erie, has cost within £6000, or $30,000 per mile. The average nett income on this line of 625 miles, may be safely stated at 7 per cent., although the Western railroad of Massachusetts, costing $7,566,791, for 156 miles of road, has only yielded the first year after its completion, about 4 per cent. The Utica and Schenectady railroad, and the Utica and Syracuse railroad, and the continuous line to Buffalo, has yielded from 7 to 12 per cent. nett.

The railway system in New England, may be considered eminently suc-

cessful, and is now a favorite investment, having the preference over bank stocks.

In England, the canals, from being a part of, and working in connection with railways and manufactories, have not been materially injured by the introduction of railways. It is true canal stocks have fallen much in value from what they were, prior to the introduction of railways. For *permanent investments*, the canals in connection with large manufactories and coaling districts, are in great repute, and have a value with their proprietors, much beyond their ratio of dividends. The Loughborough canal, gives 60 per cent. dividends, and is worth £1350 for £100 paid, or £94,500, for £10,000 paid out for its cost. The Trent and Mersey canal, that cost £130,000, yields 65 per cent. dividends and is worth £1000, for £100 paid.

It is stated that 36 canals—all the canals of Great Britain—cost £6,800,000. This is a sum not much exceeding the amount expended by the State of New York in canals, but with a very different result. This arrises from the scattered population in this State, compared with the dense population in the manufacturing districts of Great Britain, with the necessity of their use, to convey the raw materials of cotton etc., to the manufactories. This, added to the enormous amount of coal, iron, and various ores transported to the manufactories, and principally by those who own the canals, is the cause of their great value. It will take centuries to produce the like results in the United States. In the mean time, railways from their facilities in connecting distant districts and overcoming mountain barriers, are daily acquiring warm advocates, both in this country, and England. They have in fact, become indispensable for the transmission of our mails. They should merit the fostering care of the general government, instead of the abuse bestowed upon them by some incumbents of the heads of departments. For national defence, their value cannot be estimated or questioned.

J. E. B.

RAILWAY TRAFFIC.

The following calculation taken from the last weekly returns, of the first week in February, of 39 railways, in length 1456 miles, taken from Herapath's Journal and Railway Magazine, will be found highly interesting, when considered that the month of February in England, as well as this country, is not comparatively one of travel and traffic.

The number of passengers on 26 railways, was 233,551. The total for the week was about 500,000. The receipts on 39 railways, was £52,704, ditto for goods, £19,980, total, £72,684. This is an average of near £50 per mile per week. The traffic, therefore, is certainly at the rate of twenty-two millions of dollars per annum, and carrying twenty millions of passengers.

This practical view of the benefits of railways, in *gaining time*, and the transmission of a passenger, at five or six times the average speed of the stage coach, or canal, will make this class of improvement popular and indispensable.

J. E. B.

EXTRACTS FROM THE REPORT OF THE WESTERN RAILROAD.

The completion of this important work renders it necessary that we should record the principal information in regard to cost of construction—magnitude of the work, etc., as set forth in the report to the Massachusetts legislature.

The receipts and expenditures for the last year will be found in the table already given in our February number.

STATISTICS OF CONSTRUCTION.

The statistics required by law in the report, after the road is opened for use, are hereto subjoined, so far as they relate to its *construction*. And the undersigned add, also, in this connection, other data, which may prove useful or convenient for future reference.

The *length* of the Western railroad is as follows, viz: From its junction with the Boston and Worcester road, near the depot of this company, in Worcester, to the east abutment of the Connecticut river bridge, is

	Miles. Feet.		
	54.3680	or	54.697
From thence to the line of New York,	63.0568	"	63.107
Total,	117.4248	or	117.804
The length of the Albany and West Stockbridge road, from the State line to the face of the Greenbush dock at the Hudson river, is	38.1180	or	38.224
Total of both roads made by this company,	156.148	or	156.028
The length of the Worcester road from their passenger depot in Boston, to its junction with the Western, is	44.320	or	44.060
Total from the depot in Boston to the Hudson river,	200.468	or	200.089
Add from Greenbush dock to Albany shore,	1.415		268
Total from depot in Boston to ditto,	200.1883	or	200.357

ELEVATIONS.

For these, the *base line* of the Worcester company is assumed, it being the grade of that road, across the mill-dam basin in Boston, and the following are the elevations *above* that base line.

	Feet.
The depot of this company at Worcester,	476.83
The Charlton summit (between Worcester and Connecticut river,)	906.75
The depot at Springfield,	70.91
The summit in Washington (between the Connecticut and Hudson rivers,)	1,456.51
The track at the State line,	916.07
The summit in Canaan (between the State line and Greenbush,)	954.61
The depot in Greenbush,	26.11
Thus it appears, that the summit in Washington is the highest elevation of the road, and that this is above the depot at	
Worcester,	979.68
Springfield,	1,385.60
Greenbush,	1,430.40
and above the base line of the Worcester road, in Boston,	1,456.51

PLANES.

Upon the Western road there are separate planes 142, of which are

level,	12	
ascending west,	83	
descending west,	47	—130

The grades of the road vary from level to 83 feet per mile. The apportionment is nearly as follows:

From 1 to 20 feet	33	miles.
21 to 45 "	44	"
46 to 60 "	11	"
68 to 83 "	14	"
Level,	7¼	"

Between 68 and 83, there is one plane of 5 to 6 miles of 74 feet grade, and 2 grades making over 4 miles of 79 feet.

The following table shows the number of curves, with the different radii in feet, and the lengths of the different classes in feet and miles:

TABLE OF CURVES ON THE WESTERN ROAD.

Number of Curves.	Length of Radii in Feet.	TOTAL LENGTH OF EACH CLASS	
		In Feet.	In Miles.
25	22,920 to 5,730	39,887	7.5542
90	5,730 to 2,865	121,736	23.0509
59	2,865 to 1,910	72,651	13.7590
19	1,910 to 1,432	26,479	5.0333
17	1,432 to 1,042	26,054	4.9338
1	of 1042	1,500	0.2840
1	955	910	0.1723
1	882	490	0.0928
	length of straight	289,707	54.8687
	(line,	332,297	62.9352
		622,004	117.8039

The shortest curves are severally of radii of 955 and 882 feet, and they are at each end of the Tuttle Bend bridge, on the north line of Russell.

The whole number of planes on the Albany road, is		82
Of which are level,		28
Ascending west, (total ascent, 79½ feet,)	18	
Descending west, " 971 "	36	54—82

The following table shows the inclinations in feet per mile, and the lengths of each class of gradients:

Number of Planes.	Inclinations in Feet per Mile.	Total length of each Class.
2	0 to 10	0.284 miles.
17	10 to 20	5.663 "
10	20 to 30	3.362 "
16	30 to 40	17.727 "
9	40 to 44.88	9.053 "
28	Level.	2.135 "
82		38.224 miles.

TABLE OF CURVES ON THE ALBANY ROAD.

Number of Curves.	Length of Radii in Feet.	Number of Curves.	Length of Radii in Feet.
20 of	6000 and upwards	10 of	3000 to 2000
11	6000 to 5000	13	2000 to 1000
5	5000 to 4000	1	859½
7	4000 to 3000		Total degrees of curvature, 1869.

Total curved line,	20.464 miles.	
" straight line,	17.760 "	
"	38.224 "	
The whole length of main track laid on the Western road is	miles,	117.804
Length of turnout and depot tracks,	"	8.961
Total tracks laid on Western road,	"	126.765
The main track laid on the Albany road,	38.224	
Turnout and depot tracks, laid and in progress	5.750—	43.974
Total tracks laid by this company	miles,	170.739

A single track only has been laid down on both roads, with the necessary turnout and depot tracks at the stations.

On both roads, the edge rail of the T pattern, has been used (excepting on a few recent side tracks,) weighing 56½ pounds to the linear yard; supported by wooden sleepers, principally of chestnut, 7 feet long and 7 inches through, at distances of 3 feet from centre to centre. These sleepers rest on longitudinal sills of plank 8 inches by 3, with a short piece of the same 3 feet long, under them at their joints, and 4 additional pieces, 3 feet long, under the sleepers, at the joints of the iron rails. On a part of the Albany road, the sleepers nearest the joints of the iron rails are 2½ feet from centre to centre, with six instead of five sleepers to each rail; and the two sleepers nearest the centre of the iron rails have 2 short pieces, each 5 feet long, under them, to increase the bearing surface.

A small part of the turnout and depot tracks recently laid down on the Western road, and used only to deposit cars and trains upon, are of a lighter iron rail, purchased of the Lowell company, of the "*fish-belly*" pattern.

WIDTH OF GRADES.

The greater part of the Western road has been graded to a width of 20 feet in the cuts and 16 feet on the embankments, for a single track. The deep cuts and high embankments, generally, have been graded to a width of 30 ft in the cuts and 26 on the embankments, for a double track. The heaviest rock cuts are of double width; and the masonry is all for double track, except that of the Connecticut river bridge, and a few of the smallest structures.

The whole of the Albany road between Greenbush and Chatham, 23 miles, and a part of the remaining 15 miles, is graded for two tracks; the former, in the cuts, from 26 to 34 feet, and on the embankments, from 22 to 26; the latter 15 miles, in the cuts, 20 to 34 feet, and on the embankments, 16 to 26; and where graded for a single track, the earth cuts are from 20 to 24 feet, and the embankments from 16 to 20. The rock cuts, 26 feet wide, and the masonry, are all for two tracks. The portion of the road between Greenbush and Chatham was made of full width, with a view to its union with the New York and Albany road at or near the latter place, if that should be constructed.

BRIDGES.

The railroad bridges east of Connecticut river, are constructed of truss frames, after the plan of Long's patent, and are made for two tracks. The Connecticut river bridge, and those westward of it, on the Western road, are of truss frames, of Howe's more recent patent, and they are constructed for one track only. The truss frames of all are covered in on the sides and top, and thoroughly white-washed. The entire flooring of the Connecticut river bridge is covered with tin, painted of a dark color. This bridge is 1264 feet long, of 7 spans, 180 feet each.

The whole length of wooden superstructure of bridges is 6,092.5 feet, or 1 mile 812.5 feet and they are in number 48, both exclusive of road bridges over the railroad.

There are on the Albany road 17 wooden railroad bridges, including the 2 of 160 feet at the Greenbush and Albany landings; total length, 1,474 feet; 14 are for a single track only. The whole are built after Howe's plan, and the truss frames are covered in and white-washed.

There are on the Western road 10 stone arched river bridges, severally of spans of 35, 15, 45, 60, 60, 60, 45, 20, 45 and 45 feet, the grades of which, above the water, are severally 40, 12, 35.8, 49, 61.7, 67, 61, 39, 42, 28.8 feet. In addition, there are 2 stone arch bridges over highways, the grade at one of which is 52 feet above the highway, and 2 similar highway bridges over the railroad.

On the Albany road, besides 15 arched culverts of less than 10 feet span, there are two arched bridges from 10 to 20 feet span, two of from 20 to 30 feet span, and one of 34 feet, composed of 2 spans of 15 feet each, and a pier of 4 feet.

At Canaan, on this road, and about 3 miles west of the State line, is a *tunnel*, through limestone and slate rock, the grade in which is 100 feet under the surface at the highest point. It is 548 feet long, exclusive of the thorough rock cuts at each end, 26 feet wide and 19 feet high; the sides and arch being exclusively of the natural rock. It contained 9,920 yards of rock, and its excavation cost about $35,000.

The following is an *approximate* statement of the quantity of materials excavated in the construction of both roads.

	Earth Cubic Yards.	Loose Rock. Cubic Yards.	Solid Rock. Cubic Yards.	Total. Cubic Yards.
Western road,	6,156,117	81,396	543,600	6,781,113
Albany road,	1,553,423	19,177	227,395	1,799,995
Total, yards,	7,709,540	100,573	770,995	8,581,108

The quantity of masonry on the Western road, in perches of 25 cubic feet each, is about 220,586
On the Albany road, 49,968
Total on both roads 270,554

On the Albany road and depots there have been driven 3855 piles.

For the road-way, on both roads, the least *width of land* taken, except for a short distance in the village of Worcester, is 5 rods, and this has been increased, even in one case, to 18½ rods, where required for deep cuts or high embankments, allowing a *berm*, on each side, of 8 feet, for ditches and fences.

The whole quantity of land in the road-way thus located, between Worcester and the line of New York, and for the Western road, as *approximately* estimated, is 1,267 acres 73 rods.
The same for the Albany road is 381 " 78 "
Total, 1,648 " 151 "

With few exceptions, comparatively, the title has been obtained by purchase and deeds, and the claims for lands for road-way are all settled and paid off, with the exception of one on the Western and two on the Albany road, which have been unavoidably delayed, but are in progress. There are, on the Western road, 23 depots, comprising about 54 acres of land; and on the Albany road, 6 depots, containing, at present, 64 acres,—21 of which are at the Greenbush station, making, on both roads, 29 depots, with about 118 acres of land.

FINANCIAL DEPARTMENT.

The accounts for the construction of the Western road, and for the equipment of the whole line, are so far completed as to enable the undersigned to present the following:

Statement of the cost of the Western Railroad, to January 1st, 1843, with an estimate for future expenditures.

ITEMS OF EXPENDITURE.	Amount of estimates of January, 1841.	Amount paid January 1, 1843.	Amount expended or contracted for, and unpaid.	Total paid or contracted for.	Amount estimated for future additions.	Total for ultimate entire cost.
Graduation and road-bed,	2,181,746 67	2,269,983 17	12,394 74	2,282,377 91	7,000 00	2,289,377 91
Masonry exclusive of Connecticut river bridge,	639,301 42	724,158 91	1.633 07	725,791 98	3,000 00	728,791 98
Superstructure,	998,200 33	1,010,628 28		1,010,628 28	5,000 00	1,015,628 28
Connecticut river bridge and masonry of ditto,		131,612 12		131,612 12		131,612 12
Other bridging exclusive of masonry,	213,671 19	108,738 03	1,819 60	110,557 63	7,000 00	117,557 63
Depot buildings, fixtures, aqueducts, etc.	123,250 71	157,431 42	7,929 25	165,360 67	23,300 00	188,660 67
Land damages for road-way,	173,440 31	175,523 33		175,523 33		175,523 33
Depot lands,	10,585 27	16,361 49		16,361 49	5.000 00	21,361 49
Engineer department, instruments, etc.,	167,594 93	190,248 86		190,248 86		190,248 86
Miscellaneous expenses,	67,334 37	74,205 21		74,205 21		74,205 21
Engines and cars,	450,000 00	467,427 04	102,620 00	570,047 04	72,500 00	642,547 04
Interest,	209,900 67	*205,822 43		205,822 43		205,822 43
Extraordinary expenses of renting the Hudson road as a substitute for a part of the Albany road.		33,470 57		33,470 57		33,470 57
Totals,	5,235,025 87	5,565,610 86	126,396 66	5,692,007 52	122,800 00	5,814,807 52
* Interest paid to January 1, 1843,		555,263 13				
Less net income to same date,		349,440 70				
		205,822 43				

The entire cost of the Western road as now stated, exceeds the estimates made therefor by the engineer and agent, in January, 1841, by the sum of $579,781 65.

This excess occurs principally in the items of graduation, masonry, bridging, depot buildings and engines and cars. In the absence of that engineer, the undersigned proceed to state the causes of this excess, as fully as they are able, from the information at their command.

The extra cost of the graduation and masonry is caused by an omission in the estimate of 1841, to include an early payment to a contractor, who had abandoned a section, and a misapprehension of the division engineer, of the contract price of one of the heavy rock

sections,—by extraordinary disbursements authorized by the board in order to open the western part of the road before the winter of 1842—by improvements and alterations made by the road-masters after the road was opened, —properly chargeable to construction,—by the necessity of greatly increased expenses, in raising the original grade in the mountain division, to protect the road-bed against the freshets of an impetuous stream, and by grading and masonry, more recently required by the business of the road for additional depot and turnout tracks, and depot accommodations.

The last cause has also operated to increase the *superstructure* account.

The excess in the cost of *bridging* arises from work not originally contemplated,—such as *tinning* the whole flooring of the Connecticut river bridge,—placing, for greater security, 3000 perch of rubble stone about the piers; and the cost of extra timber for an entire span of that structure, to be housed and kept on hand for future use, in case of any casualty requiring it. And a similar supply of timber for renewing suddenly the superstructure of any other bridge on the road, together with recent expenses of strengthening the bridges between Springfield and Pittsfield. To these is now added a small estimate for future contingencies.

The large excess in the account for depot buildings is almost entirely caused by increased accommodations at the various depots, and by the addition of new ones, shown to be indispensable to the increasing business of the road; and by an estimate for future contingencies of the same character. The principal details of these have been hereinbefore stated.

The same causes have operated to increase the cost of depot lands.

The cause for the great excess of about $192,000 for the items of engines and cars, has been already fully explained.

In connection with this subject, it may not be irrelevant to add, that such was the character of many parts of the line, and particularly of the mountain division, that it was impracticable even for an experienced engineer to estimate before-hand, the cost of construction, with reasonable accuracy.

The 7th or mountain division, of 13.89 miles, has cost $980,000, or over $70,000 per mile. A single mile of that division cost $219,929 87. The summit section in Washington 1.8 miles long, cost about $241,312 39, or per mile, $134,000. It had in it 97,000 cubic yards of rock excavation, much of it very hard.

About 1100 feet of the embankment in the Richmond swamp, settled below the natural surface from 75 to 90 feet, as estimated; and that section alone contained 241,800 cubic yards of excavation, and it cost about $110,000. The single structure of the Connecticut river bridge cost $131,612 12.

The construction accounts of the Albany and West Stockbridge railroad are not so fully closed. The last division of that road was opened, only in September last, and the final measurements and estimates of a part of it, are but just now made out. The contracts for the very extended works at the Greenbush depot, are, some of them, still outstanding. The resident engineer, however, presents the following, as an approximate statement of the cost of this road, with an estimate for future additions and payments.

Statement of the cost of the Albany and West Stockbridge Railroad, to January 1st, 1843, with an estimate for future expenditures.

ITEMS OF EXPENDITURE.	Amount of estimates of January, 1841.	Amount paid January 1, 1843.	Amount expended or contracted for, and unpaid.	Total paid or contracted for.	Amount estimated for future additions.	Total for ultimate entire cost.
Grading, bridging and masonry, including Greenbush depot,	646,099 00	761,381 75	93,400 00	854,781 75	10,000 00	864,781 75
Superstructure,	380,783 00	287,609 21	16,600 00	304,209 21	4,000 00	308,209 21
Depot buildings, fixtures, aqueducts, etc.,	28,511 00	87,158 55	52,500 00	139,658 55	20,500 00	160,158 55
Land damages,	83,985 00	91,180 15	550 00	91,730 15	1,554 77	93,284 92
Depot lands,	41,154 00	30,547 18		30,547 18	9,000 00	39,547 18
Fencing,	36,447 00	25,054 16	7,500 00	32,554 16		32,554 16
Engineering, superintendence, instruments, etc.,	40,825 00	49,721 65	5,000 00	54,721 65		54,721 65
Miscellaneous expenses and contingencies,	20,000 00	17,056 56	9,000 00	26,056 56		26,056 56
Interest,	70,000 00	100,994 81		100,994 81		100,994 81
Part payment to Hudson company for right to build partly on their road-bed,		36,000 00		36,000 00		36,000 00
Payments to original stockholders for their preliminary expenses,		18,136 58		18,136 58		18,136 58
Steam ferry boat and fixtures, etc., for ditto, in Albany.	65,000 00	16,738 68	800 00	17,538 68		17,538 68
Totals,	1,412,804 00	1,521,579 28	185,350 00	1,706,929 28	45,054 77	1,751,984 05
Add the same for the Western road,	5,235,025 87	5,565,610 86	126,396 66	5,692,007 52	122,800 00	5,814,807 52
Totals, both roads,	6,647,829 87	7,087,190 14	311,746 66	7,398,936 80	167,854 77	7,566,791 57

The entire cost of the Albany road, as above stated, exceeds the estimate of January 1841, by $339,180 05; and this excess has arisen *entirely* from payments and expenditures for work not included in the original estimates.

As has been before represented, the whole character of the depot arrangements at Greenbush has been changed by authority of the board; and the whole accommodations, including lands, buildings, fixtures, docks, and bridges, have necessarily been very much enlarged.

In the summer of 1841, while the grading between Greenbush and Chatham was in progress, with a view to its completion early the following summer, the board, having resolved to push the work on the last division of the Western road, so as to open it for use during that year, gave directions also, to expedite this work and lay down the track so as to run the trains through between Worcester and Greenbush, before the winter should close in. This caused a heavy expenditure.

It was found also, in the progress of all the work on the line, through extensive clay and slate rock districts, that the security of the road required much more enlarged excavations and embankments than had been contemplated.

The preceding tables show that for the completion and full equipment of both roads, and for future additions deemed necessary, the expenditure will be $7,566,791 57.

But it should be borne in mind that there are sinking funds, provided for both roads and set apart to aid in the final liquidation of the debts incurred in their construction.

The amount of these on the 1st of January, 1843, was for the

Western road,		$177,529 58
Albany,	about	107,000 00
Total,		$284,529 58

And, although this is not available for present purposes, it is proper to consider it as *assets* of the company, in comparing the value of the work with its cost.

Several errors having crept into the paper on Dr. Earle's process, in our January number, we give it a second insertion, with some additional matter.

To the Editor of the Railroad Journal.

Philadelphia, February 22d, 1843.

Sir,—The following documents and testimonials explain themselves; and it is presumed, cannot be read without producing a strong conviction of the value and importance of the "Process" to which they relate. I beg the favor of an insertion of them in the Railroad Journal, and am, very respectfully, your ob'dt. servant, Edw. Earle.

Ordnance office, Washington, 12th Jan., 1843.

Hon. J. C. Spencer, *Secretary of War.*

Sir,—I have to acknowledge the receipt of a letter from the Hon. R. H. Bayard, of the United States Senate, requesting to be informed of "the result of any experiments that may have been made under the auspices of the Department, in relation to Dr. Edward Earle's method of preserving timber and cordage; together with the opinion of the department, or of any of its officers, as to its practical value,"—the same being referred to this office for a report.

The great cost of gun carriages, and the difficulty of obtaining suitable timber for their construction, induced this office, early in 1840, to consider

whether the interests of the service could not be promoted by the adoption of measures to prevent their decay. "Kyanizing," and "Dr. Earle's process," were both duly considered, and the great expense of the former led to the use of the latter, by authority of the Secretary of War. Since the summer of 1840, about 70,000 cubic feet of timber have been cured at the Watervliet Arsenal, the greater part of which is deposited in store for future use. The exact cost of the operation cannot be stated; but it is believed to be about* cents per cubic foot, and one and a half cents for the use of the patent right.

Sufficient time has not yet elapsed to prove the value of the process by the trials of gun carriages in service; but during the period of operations, the person charged with the supervising the curing of the timber (Mr. R. M. Bouton,) has made some experiments, which are set forth in a printed paper published by Dr. Earle, which is hereto appended.

Mr. Bouton is a man possessed of much more science than is usually found in such a first rate practical mechanic, and full reliance may be placed in his statements.

Upon a careful examination, of the subject, which its importance to this office, in a pecuniary view at least, seemed to demand, I have formed the opinion—

1st. That the impregnation of timber with the sulphates of iron and copper may be effected by its immersion in a proper solution of those minerals at a moderate heat, and with timber of any size or length.

2d. That timber, thus cured, will be in a great measure incorruptible, free from the attacks of worms, and from dry rot.

3d. That its strength is not reduced, and its toughness or fibrous texture is improved.

4th. That the cheapness of the process, united to its beneficial effects, promises a great reduction in the expenditures for such objects as are susceptible to its use, among which canvass and cordage seem to occupy a prominent place; and finally,

That this process will furnish the desideratum for the preservation of many things to which it is applicable, and should be patronized by the government.

I have the honor to be, Sir, very respectfully, your ob'dt. serv't.

G. TALCOTT, *Lt. Col. Ordnance.*

(INDORSEMENT BY THE HON. SECRETARY OF THE NAVY.)

Navy Department, Jan. 17th, 1843.

"I unhesitatingly express my full concurrence in the opinion and recommendation of Col. Talcott with [illegible]given. I have no doubt that Dr. Earle's process might be advantageously applied to a great variety of materials used in the Naval service, and that the saving to the country would be incalculably greater than the cost. I therefore strongly recommend the adoption of Dr. Earle's process upon such terms as may be considered fair and just between him and the country.

"A. P. UPSHUR."

Navy Yard, Washington, 5th Jan., 1843.

SIR,—Agreeably to your order of to-day, I have tested the relative strength of the two pieces of rope received from Dr. Earle, being, according to his representation, different portions of the same rope; one being pre-

* The cost is here omitted because the several items constituting it could not be separately ascertained. According to Mr. Bouton's Report, however, it does not exceed 3 1-3 cents per cubic foot, and this may be confidently affirmed very much to exceed what is necessary, when the operation is advantageously conducted. E. E.

pared, according to his process, with the sulphates of iron and copper, the other unprepared; and find the result to be as follows:

The unprepared piece sustained a weight of only 71 pounds (average,) and the prepared that of 133 pounds; making a difference of 62 pounds in their relative strength.*

Very respectfully, your ob'dt. serv't.

ALFRED TAYLOR, *Lieut.*

CAPT. B. KENNON, *Com'dt.*

Dr. Earle may make any use of this paper he chooses.

B. KENNON, *Captain, Washington Navy Yard.*

Office of the Baltimore and Susquehanna Railroad Company,
February 6th, 1843.

DEAR SIR,—Having been absent from the city, I did not receive your favor of the 3d inst. until Saturday.

It gives me pleasure, now, to state the substance of the reports made to me by the superintendent, and by the machinist of this company; the statements of whom may be relied on with confidence. I only regret that the shortness of the period, during which we have been making use of Dr. Earle's process, does not enable us to speak with as much certainty of its effect in preserving timber as I could desire.

1. We commenced the use of Dr. Earle's plan on the 3d April last.

2. The largest piece of timber to which his process has been applied, was one of yellow pine, 25 feet long and 13 by 10 inches in width and thickness. This was used for a turn-table, and, in framing, it became necessary to notch each piece half way through, near the centre. It appeared to be well saturated with the solution, judging from the deposite of copper on the tools, and from the wetness of the wood, which had been seasoned before being placed in the vat.

About seven months since, the superintendent took two stakes made of a piece of white pine board, one inch thick. One of these he placed in the vat with some timber preparing for the road. They were subsequently both stuck in wet earth. The stake that was *Earlized* is now perfectly sound; the other evidently decaying.

From these circumstances it may, I think, fairly be inferred, that Dr. Earle's process will have a considerable effect in preserving timber from decay; but we have not had sufficient experience to justify us in pronouncing our opinion, as to the extent to which this effect will be produced. We are continuing to subject all the timber used in repairs of our road, to the treatment recommended by him.

With much respect [illegible]ours, very truly,

CHAS. HOWARD, *Pres't.*

GEN. JNO. S. SMITH, *Washington.*

From the Civil Engineer and Architect's Journal.

CONCRETE, ITS INTRODUCTION, COMPOSITION, USES, & COMPARATIVE EXPENSE.

Concrete was first used in this country by Sir Robert Smirke, at the erection of the Penitentiary at Millbank, afterwards at the undersetting of the walls of the New Custom House, and has been generally used by the above named architect in the public buildings since erected under his care, especially at the club house of the Oxford and Cambridge University in Pall Mall, where the whole area of the building, and to the extent of two feet beyond the line of the lowest footing, was covered to a depth of 2½ feet,

* The strength being tried by applying the strain to each individual yarn.

the depth being increased to 4 feet under all the walls that rise to the roof; in the specification of the last named building it is thus described. "For the grouted stratum clean river gravel is to be provided, and mixed with lime ground or pounded to a fine powder; it is to be well mixed with the gravel, twice turned over before it is wheeled to the excavation, and it is to be thrown from a height of not less than 6 feet in every part. A man to be kept treading down and puddling the mass as it is thrown down; the proportion of materials to be 6 parts of gravel to one of Dorking, Merstham, or Haling stone lime." It has now become, in the present day, the most favorable expedient resorted to for artificial foundations. Mr. Ranger, of Brighton, improved the above hint by using hot water to facilitate the setting, for which he took out a patent for making artificial stone. A detailed account of the application of Mr. Ranger's artificial stone to the building of docks and river walls at Chatham and Woolwich, is given in the first volume of the *Journal*, being a paper by Lieut. Denison, from the Papers of the Corps of Royal Engineers. Analogous to concrete is beton, from which it differs, in broken stone being used instead of gravel, in the proportion of two of stone to one of lime or pozzolana of Itally, a description of which, taken from the *Franklin Journal*, appeared in volume 3, page 265, of your valuable periodical. Since the introduction of concrete, some little difference of opinion as to the proportion of materials and manner of mixing them has arisen among engineers. I therefore give the composition from several specifications: No. 1. The concrete to consist of 5 parts of clean gravel, perfectly freed from loam or clay, with a proper proportion of small gravel and sand, as well as large, and one part of lime measured dry, the lime to be mixed into a perfectly smooth uniform paste, as for the mortar, but with more water, and then thoroughly mixed with gravel. No. 2. The concrete to be composed of sandy gravel and well burnt lime, in the proportion of 3 of the former to 1 of the latter. The gravel to be free from all earthy matter, and the pebbles not to exceed one inch in diameter. The lime is to be used in a hot state when slacked, and to be immediately mixed, using no more water than is sufficient to incorporate them. After being twice turned, it is to be wheeled on to a stage 10 feet high, and let fall into the trench; it is not to be puddled or disturbed in any way until perfectly set. No. 3. All concrete must be composed of gravel perfectly clean, and mixed with fresh well burnt lime in the proportion of 6 of gravel to 1 of lime. The lime and gravel to be mixed in a dry state, and a sufficient quantity of water afterwards added. No. 4. Concrete to be composed of good lime, gravel, and sand, in the proportion of $\frac{1}{7}$ to $\frac{1}{9}$ of lime, and it should be laid in about 12 inch layers or courses, and pitched from a height of 10 to 12 feet, neither should it be disturbed until properly concreted and set.

In the above five opinions, including that of Sir Robert Smirke, we have the relative proportions of gravel and lime, varying from 3 to 9; and No. 1 states the lime and water to be first mixed, in which No. 2 nearly coincides, while No. 3 insists on the gravel and lime being first mixed, and then the water added; Nos. 4 and 2 coincide that the concrete is not to be disturbed after it is thrown into the trench, while Sir Robert Smirke expressly states that parties are to be employed puddling the mass. The whole are agreed in specifying that the material is to be thrown from a height. From considerable practice and experience in the mixing of concrete, I think that the lime need not be ground, but simply mixed with the gravel, and then, by the addition of water, it will fall to an impalpable powder, also that it is unnecessary to be at the expense of puddling the mass after being deposited in the trenches, neither is there any advantage to be derived from discharging the

mixture from a height, both of which operations increase the expense of the concrete, and as the concrete in the act of setting expands in bulk, I think that alone a sufficient proof of the inutility of both of the above mentioned operations, their tendency being to condense the mass, while its own natural tendency is to expand. With respect to the proportion of lime and gravel, I think the less lime the better will be the concrete, and that the proportion of 8 to 1 of lime is decidedly better than 3 of gravel to 1 of lime. As to the quality of materials employed, the lime must be stone lime, fresh from the kiln; that from chalk will not do, and hydraulic or lias lime is to be preferred to stone limes. With respect to gravel, if obtained from a pit, the ochereous or ferruginous is to be preferred, and if loam is present, so as to soil the hand, the gravel must be washed, if the gravel be obtained from rivers by dredging, alluvial and vegetable deposits are to be avoided; and if the gravel contain vegetable refuse, it must be screened or washed. Shelly sharp gravel is the best, the proportion of small or large pebbles, and the due quantity of sand, is soon learned with a little practice.

As to the uses of concrete, it is principally adopted as an artificial foundation, and from four to six feet is a sufficient depth, and extending two feet beyond the space to be occupied with the building. The following testimony of the utility of concrete, is from Weale's bridges, page 31. "Piling will probably never be found more safe than a body of concrete; the latter cannot be too much esteemed, for its durable and almost imperishable nature, besides being quite as safe and, perhaps, more durable than piling;" and from the paper of Lieut. Denison, before alluded to, we have the following ratification of its uses. "Concrete cannot be advantageously employed as a building material." "It may be employed with advantage in backing retaining walls." I. K. Brunel, Esq., C. E., has used concrete as a foundation, nearly exclusively and universally in the bridges on the Great Western railway; and in the celebrated bridge of Maidenhead, the land arches are backed with concrete. In culverts underneath embankments, the same able engineer has extensively used concrete as a backing material, the brickwork being kept thin, and then enveloped in a mass of concrete, in the form of a polygon, of six sides, or, of the form of two truncated cones, with their bases joined.

Concrete was used on the Great Western railway, wherever it could be employed, as a backing material; its use is now rapidly extending to the provinces, and bids fair to supersede all other means now employed for making a foundation; it is much improved by being mixed with oxide of iron, smith's scales, and roasted iron stone, or any material containing iron. As regards the comparative expense, brickwork being the most common building material, has been taken as the standard of comparison with concrete for price, and its cost in most districts will be found from one-third to one-sixth the price of brickwork, taking a cubic yard as the quantity of each material, the latter will cost 5*s.* and the former 21*s.* both, to a great extent, being regulated by the vicinity of brickyards, and the facility of obtaining gravel. I have known concrete executed at 3*s.* 3*d.*, 3*s.* 6*d.*, 4*s.*, 4*s.* 6*d.*, 5*s.*, 7*s.* 6*d.*, 8*s.* 6*d.*, and 11*s.* 6*d.* per cubic yard, although the most common price is 7*s.* 6*d.*; as to brickwork, the general price is 21*s.*, and the range is from 14*s.* to 27*s.* 6*d.* per cubic yard. The London price being 25*s.* per cent. dearer than the country. The facility of obtaining lime regulates the cost of concrete; the price of lime per cubic yard, measured dry in clots, at Dorking in Surrey, is 11*s.*; Barrow in Leicestershire 21*s.*; Bulwell in Nottinghamshire 9*s.* 6*d.*; Breadon in Derbyshire 15*s.* 6*d.*; Harefield in Buckinghamshire 16*s.* 6*d.*; Fulwell, Durham county, 9*s.* The measures of

lime, also, vary much; in some places it is sold by the cubic yard, measured dry, which is decidedly the best method adopted; it would be desirable if it was universal. It used to be sold in London by the hundred, as it was called, not of weight, but a measure, a yard square, and a yard and one inch deep, which will be equal to 16 or 18 bushels, but it is now sold by the cubic yard. The Fulwell and Barrow lime is sold by the quarter, eight of which make a ton and a half. Lime is also sold by the boll and chaldron; a chaldron will be about 3½ tons, a single horse cart about 6 bolls. In agricultural districts, the bushel, boll and quarter are used; in colliery districts, the chaldron and ton are the standard of measure. With respect to the cost of gravel, provided it can be obtained on ground belonging to the company, the getting, screening, and cartage will cost 1*s.* 6*d.* to 2*s.* per cubic yard; if it be obtained from the gravel pits of the country, the charge will be per ton, from 2*s.* 6*d.* to 2*s.* 9*d.*, if screened 3*s.* 3*d.* to 3*s.* 10*d.*, if broken 6*s.* 10*d.* A cubic yard will weigh from 24 to 27 cwt. If the gravel is dredged or brought from the shores of a river, the cost will be 2*s.* 6*d.* per yard, or nearly the same as from the pit. The prices of the various operations of getting, screening, and washing gravel are respectively 10*d.* and 12*d.* per cubic yard. The price of excavation is also included in the price of concrete in all railway specifications, which will be about 4*d.* per cubic yard, as generally the excavation is of limited extent, and consequently more expensive than an extensive excavation, and when the gravel is obtained on the ground of the company or proprietor, the excavation is a double operation, the hole having to be refilled with other materials in lieu of the gravel obtained. From the experience of several thousands of yards and variety of situations, I find the cost of mixing the materials, or as it is termed concreting, to be 1*s.* per cubic yard, and taking the proportion of material at 5 to 1, the following will be a fair estimate of the cost of concrete:—

	s.	*d.*
1 cubic yard of lime,	12	6
5 do. of gravel at 2*s.* 6*d.*,	12	6
Labor mixing at 1*s.* per yard,	6	0
6 yards of excavation at 4*d.*,	2	0
Waste, contingencies and profit, at 1*s.*,	6	0
6 cubic yards, at 6*s.* 6*d.*, =	39	0

Concrete will set in 24 hours; the specific gravity is 125, or about the same as brickwork, although brickwork is sometimes 165 lb. per cubic foot. Lieutenant Denison gives the strength of concrete $S = \frac{l W}{4bd^2}$. The constant S being 9·5, and comparing concrete to York paving, the proportion is as 1 to 13.

The following works may be consulted; Colonel Pasley, on Calcareous Cement: Weale, 1839; Aikin, on do., in Transactions of Society of Arts; Lieutenant Denison's Notes on Concrete, from papers of Corps of Royal engineers, *Journal*, volume 1, p. 380; Lieutenant Colonel Ried, ditto, see also, the *Journal*, volume 1, p. 134; a letter on concrete, by a Constant Reader, volume 3, p. 265, volume 5, p. 58, 276.

I am, etc., O. T.

St. Ann's, Newcastle-upon-Tyne.

For the Railroad Journal and Mechanics' Magazine.

PRODUCE AND MERCHANDIZE DIVERTED TO BOSTON BY "LOW FARES."

By an official report to the legislature of Massachusetts under oath, we derive some facts that may be interesting to us.

It appears that the whole number of way and through passengers, passing over the Albany and West Stockbridge railroad and Western railroad, 156 miles, to the Boston and Worcester railroad, was 190,436.

The number of miles run by the merchandize cars, was			160,089
Equal to single trips, *through* 156 miles,			1,026
The weight of the merchandize carried over the road, was equal to 6,211,971 tons *nett*, transported one mile only. Or, equal to, carried over the whole road, 156 miles,	tons,		39,820
This, for 1026 trips, gives per trip,	"		38¾

The average tonnage per trip is very much below the ordinary capacity of the freight engines, and much below what would be desirable for a profitable freighting business.

The report then goes on to state:—"as a striking evidence of the excess of business turned East, it may be stated, in reference to the business of the Greenbush station, opposite Albany, that during the last year there were

sent from that place eastward 170,715 bbls. flour,	tons,	18,615	
And other merchandize,	"	12,374	—30,715
The amount received at Greenbush from the East, for the last year, was	"		5,624
Difference,	"		25,091
The amount *through* from Albany to Boston, was	"	14,128	
Amount through from Boston to Albany,	"	2,472	
Difference,			—11,656

The directors make the remark:—"It ought to be borne in mind, that, at the commencement of the year, the road had but been partially opened to the Hudson river, giving an access to a community, before that time, almost secluded from an eastern market. The business sought for, had long been accustomed to other and desirable channels of communication, and to other and *larger markets.* The last year has been therefore, emphatically one of experiment,—a year for ascertaining the difficulties of the trade in which we have embarked, and for gaining a knowledge of the means by which the difficulties might be obviated for the future. We virtually had no experience to guide us, in fixing upon tariffs of charges, *that would command the traffic, etc.* Notwithstanding these embarrassments, the undersigned look upon the past year as one of signal success."

Let us regard the subject in view of the low rate of 32 cents for a barrel of flour from Albany to Boston.

They took over their road 170,615 barrels, or	tons,	18,341	
There was taken from Albany in merchandize, beef, pork, etc.	"	12,374	—30,688
The whole tonnage carried over the road,			39,820
Difference, all the business of New England,	"		9,132

It would appear that three-fourths of the freight business over the Western railroad, was from the mouth of the Erie canal, while 16,560 tons, (principally flour,) was distributed on the line of the road. There were about 240,000 bbls. of western flour sent by schooners, and through New York to Boston. A reduction of fare to 25 cents per bbl., as contemplated, will command this freight, while they can afford to take sugar, molasses, and bulky articles, by the return trains, *at half the rates* we now charge by our tow boats on the North river. We argue this to be the case, as we perceive the *through* freight going east, is 30,688 tons,—compared with 5624 tons transported west. That they will profit by the "last year's experience," and "*so regulate their charges as to command the traffic,*" to a considerable ex-

tent, there can be no question. They have $7,050,000 embarked in the Western railroad to Albany. Boston owns half the railroad stock on the line from Albany to Buffalo. She has, with the citizens of New York, $30,000,000 of capital advantageously invested in railways, yielding a nett profit exceeding 6 per cent. per annum. The capitalists of the city of New York have expended about $10,000,000 in the way of improvements, and cannot put their finger on a single railroad enterprize that yields her a dividend. They have all been ill judged, while she leaves the line to Albany, through a fertile and rich country, to linger, when it has been repeatedly demonstrated, by repeated examinations, and estimates uncontradicted, that this road will pay a better income than any railroad in the United States.

J. E. B.

CIRCULAR

From the committee appointed by the National Institute for the promotion of Science, in June, 1842, consisting of—

Hon. JOHN. C. SPENCER, Secretary of War, chairman.
Hon. LEWIS F. LINN. U. S. Senator, Missouri.
Hon. WM. C. PRESTON, U. S. Senator, South Carolina.
Hon. JOS. R. INGERSOLL, House of Representatives, Philadelphia, Pa.
Hon. ABBOTT LAWRENCE, Boston Mass.

WASHINGTON, February 24, 1843.

To the friends and correspondents of the National Institute and the members of scientific and learned societies of the United States, etc., etc.

On the 15th of October last a circular was addressed to the scientific and literary men of the United States, transmitting a copy of certain proceedings of the National Institute for the promotion of science, and inviting particular attention to that portion of the proceedings which contemplated the general meeting proposed by the Institute to be held at the seat of government.

The circular was at first attempted to be sent directly to individuals, but it was soon found impracticable to address all who were entitled to special invitation. The members of the institute, and those who had, in various ways most liberally contributed to the promotion of its objects, were of course expected to attend; yet the difficulty of obtaining all the names and residences of others, eminent in the various branches of knowledge, rendered it necessary to resort to a more general mode of effecting the purpose. With this view the circular was published in the papers of the District of Columbia, and was thus made general.

The object of the first circular was not to fix any particular time for the meeting, nor was it intended by the Institute or the committee to make Washington the place of all subsequent meetings, if it should appear to be contrary to the judgement of those who had the right to decide upon such an important question. It was rather to obtain preliminary views of the friends of the Institute, and general information as to the time and mode of convening; and afterwards to adopt a plan and a time (which might be gathered from the replies of those whose opinions had been solicited) to be the most convenient.

These replies have been numerous and interesting, and present almost without exception a decided approbation of the step that has been recommended, as well as of the course of the Institute under the auspices of which that step has been begun. The committee, after having carefully considered these replies, have come to the conclusion that the month of April, 1844, is the period which will best suit the convenience of all.

The committee were aware that several previous attempts had been made to get up a similar meeting upon the plan of the British Association, and that those attempts had proved fruitless. Perhaps too much was expected at a time when our learned men were unprepared for co-operation in such extended plans. But the idea had found favor, and it may be affirmed justly that we owe, in no small degree, to the system of State geological surveys the present improved prospect of accomplishing a noble and long-cherished object.

Under these circumstances, about three years ago, some of the gentlemen engaged in the New York survey (the fruits of which are already beginning to appear in published volumes, reflecting honor upon the liberality of the State and credit upon the abilities of those who have been engaged in the enterprise) proposed to bring about the object by a different method. Circulars were sent by them to geologists of other State surveys, and a meeting was held in Philadelphia in 1840. This meeting was respectable, and resulted in the formation of the "Association of American Geologists." It adjourned and met again in Philadelphia in 1841. At the second meeting it was deemed expedient to adopt the foreign plan of changing the place of meeting. Boston was chosen as the place for the third meeting, at which its objects were extended, and the association became the "Association of American Geologists and Naturalists." The fourth meeting is to be held in Albany during the month of April, 1843.

The proceedings of this association had been witnessed by the National Institute with feelings of deep interest; and in 1841 a formal invitation was sent from the latter to the former, requesting them to make Washington the place of one of the annual meetings. The invitation was promptly accepted, and it has been decided that the fifth meeting of the "Association of American Geologists and Naturalists" is to be held in Washington in the month of April, 1844.

The disadvantages and inconvenience of two meetings have, after mature reflection, appeared to the committee so obvious, that they have thought it best to fix the first Monday of April, 1844, as the period for the general meeting; and they take this occasion and mode of respectfully inviting to Washington, in the name of the National Institute, the members of the American Philosophical Society, the oldest scientific institution of our country, the members of the Association of American Geologists and Naturalists, and the members of all other scientific and learned societies in the United States, the honorary and corresponding members and friends and patrons of the Institute, and all others engaged and concerned in the "increase and diffusion of knowledge among men."

The plan of operations will be left entirely to those who may be present on the occasion; the Institute and the committee, without attempting to control them in any manner, charge themselves with the duties of making every preparation in their power, adapted to facilitate the scientific objects the promotion of which such a body may be supposed to cherish.

The following report of a minority of the committee on Internal Improvement of the North Carolina legislature contains an excellent answer to some widely current and fallacious opinions in regard to railroads etc. The report of the majority is embodied in the one now published, and we therefore give only the latter. It also contains useful information upon the public works of North Carolina, and will well repay the perusal.

EXTRACTS FROM THE REPORT OF THE MINORITY OF THE COMMITTEE ON INTERNAL IMPROVEMENTS, SUBMITTED TO THE LEGISLATURE OF NORTH CAROLINA.

The minority of the committee on Internal Improvement, have read, with regret, the report of the majority of the committee, on so much of the Governor's message as relates to the subject of internal improvement. The scope and tendency of the report, if not so designed, is to render odious, the message in relation to this subject, to draw into discredit and disrepute the works of internal improvement already established in the State, and to prejudice the public mind against all and every improvement, which may be now contemplated or hereafter devised. To accomplish this purpose, the majority report from carelessness or inadvertence, has assumed facts and hazarded assertions, many of which are altogether groundless, and utterly unauthorized as the minority will now attempt to demonstrate. The report commences with a concise review of the various recommendations in relation to Internal Improvement, contained in the Governor's message, and then proceeds with the following assertion: "The legislature has from time to time granted away to associated wealth, in the shape of corporations, the rivers of North Carolina, and now the people cannot carry a boat load to market, without paying tribute money to navigation corporations." Is this true? The slightest inquiry or the least investigation would have satisfied the majority, that this assertion is entirely without foundation. The principal rivers of the State, are the Roanoke, Chowan, Cape Fear, Neuse, Pasquotank, Tar, Cashie and Trent, on not one of which except Cape Fear, is a cent of toll levied, or authorized to be levied on the transportation of produce below the Falls thereof and but one of them above the Falls, to wit, the Roanoke, where the navigation has been opened and improved at an expense of four hundred thousand dollars by a joint stock company, created by acts of the general assemblies of North Carolina and Virginia. The report of the majority proceeds and asserts, that "the legislature has, from time to time, granted in like manner, exclusive privileges to railroad companies, until they have been stimulated to begin such enterprises; and after exhausting their own means, these railroad companies have procured the credit of the State, and finally involved the people in a debt of more than a million of dollars; though, in the outset, the capitalists who asked for the charters professed to ask nothing but the right of spending their own money for these works. Had they proved profitable, the people at large would enjoy no right but the benefit of paying tribute to these corporations, for carrying them or their produce from home to a market; but, so soon as they proved to be a losing concern, by little and little, the loss must probably fall upon the State treasury. The State had little or no chance of the profit, yet the State is to bear the loss." A more uncandid, disingenuous and incorrect paragraph, has been rarely, if ever witnessed in any paper whatever, and more especially, one emanating from an important committee, appointed to consider subjects deeply interesting to the people of the State. The first assertion in the paragraph, is "that the legislature has from time to time granted in like manner, exclusive privileges to railroad companies." Has any exclusive privilege been granted to railroad companies as asserted, or has any individual, or set of individuals, by the acts of assembly incorporating such companies, been deprived of any privilege previously enjoyed? None whatever. The leading privilege granted to these companies, is to transport on their roads persons and produce at a moderate rate of compensation, and for this purpose, to become common carriers in their corporate capacity. Is any individual, or set of individuals, who may choose to associate together, prohibited from carrying persons and produce whithersoever he or they may please? Are

not persons daily and hourly thus employed in every direction and in every part of the State? No one is bound or obliged to use railroads or avail himself of their advantages, unless at his will and pleasure free and untrammelled. The former mode of transportation of persons and products by stages and wagons or private conveyance, is left free and unincumbered, and none need resort to railroads unless they find their interest promoted by doing so. Certain it is, that unless this mode of transportation by railroads is cheaper and better than the former method, they will not be employed, and that they are so employed, affords the most conclusive and satisfactory evidence of the great benefits and advantages resulting from this mode of conveyance. The report of the majority proceeds: "And after exhausting their own means, these railroad companies have procured the credit of the State, and finally involved the people in a debt of more than a million of dollars; though, in the outset, the capitalists who asked for the charter, professed to ask nothing but the right of spending their own money for these works." The fact is notorious, and it ought to have been, if it is not, within the knowledge of the majority, that the people at present are not involved in a debt of more than one million of dollars for the railroad companies, or indeed, for any other sum.

It is true, the Wilmington and Raleigh railroad company, have obtained the credit of the State as security, for two hundred and fifty thousand dollars for which liability, the State has the most abundant and ample security. To secure the State against loss, a mortgage has been executed, under authority of law, on the railroad, the construction of which cost between one million five hundred thousand and two millions of dollars, and whose annual income under the present disastrous and discouraging state of things, after paying all the ordinary expenses of the road, amounts to about sixty thousand dollars. Nor is this all. The mortgage also includes all the property of the company, consisting of steamboats, engines, cars, coaches, lots, wharves, warehouses and depots, worth at a low estimate, independent of the railroad, at least fifty per cent. more than, and perhaps double the amount for which the State is security. It is then absolutely certain, that the State can sustain no loss on this account, unless through the most unwise and blundering legislation. Let us now see how the matter stands in relation to the State liability for the Raleigh and Gaston railroad company.

Under an act of the general assembly passed at the session of 1838, the public treasurer was authorized in his official character, to endorse the bonds of the Raleigh and Gaston railroad company, to the amount of five hundred thousand dollars, by which the State became security for that sum. To secure the State against loss, a mortgage was made by the company, which cost more than a million and a half of dollars, and this was considered at the time, and is now deemed to be ample indemnity. But the State has other and additional security. At the session of 1840, the legislature agreed that the bonds of the company should be endorsed by the public treasurer for the further sum of three hundred thousand dollars, provided the stockholders of the company would give their individual bonds, with good security, to secure the State against loss for the five hundred thousand dollars endorsed by the State in 1838 as before related, and another mortgage on their railroad and all the other property of the company; which condition has been strictly complied with, as we are informed by the governor in his annual message to the general assembly. It will thus be seen, that although the State is security for the Raleigh and Gaston railroad company, for the sum of eight hundred thousand dollars, yet, to indemnify and save harmless the State, a mortgage has been executed for the whole of the railroad and

other property of the company, which cost about double this sum, and the State has the further security of the bonds of individuals with good security for five hundred thousand dollars. With what justice and propriety can it, then, be asserted that the people are involved in a debt for the railroads, amounting to more than one million of dollars? In reference to so much of the majority report as declares that when the stockholders of the railroad companies asked for the charters, they professed to ask for nothing but the right of spending their own money for these works, there is surely some misapprehension, at least in relation to the stockholders in the Wilmington and Raleigh railroad company; for although no aid was granted by the State to effect the work at the time the first charter was granted, the stockholders always looked to the State for assistance, by way of subscription to the stock of the company, which was obtained at the session of 1836. Again says the majority report: "Had they (the railroads,) proved profitable, the people at large would enjoy no right but the benefit of paying tribute to these corporations, for carrying them or their produce from home to a market; but as soon as they proved to be a losing concern, by little and little, the loss must probably fall upon the State treasury. The State had little or no chance of the profit, as long as there was any hope of profit, yet the State is to bear the loss." This is another glaring example of disingenuousness, for which the majority report is particularly remarkable. If the State contributes nothing towards the construction of railroads, and those works are effected at the expense of individuals, what other benefit can the people or State who contribute nothing to the works, expect to derive from them, other than to have their persons and produce transported to market at a moderate rate? He that sows not, neither shall he reap. And upon what principle of equity or justice, can those, who stand aloof and husband their resources, unwilling to aid in accomplishing a great public work of acknowledged utility expect to derive profit from the same in the shape of annual income?

In proportion to the interest which the State has taken in the railroads, (and only in one of them has she any direct interest,) she enjoys an equal chance of profit, in proportion to her subscription, as other stockholders—and more than this she cannot expect. In regard to the other railroad—if the work had turned out to be a profitable investment, the State having subscribed nothing to construct the road, could rightfully expect no profit, except the general benefits and advantages resulting from cheaper and more expeditious transportation to market. Whether the loss of making the railroads in this State is likely to fall upon the State treasury, has been already abundantly disproved. The majority report further sets forth, that "your committee have good reason to apprehend that the same beginning of turnpikes, by corporation charters, will terminate in a similar way to North Carolina. Indeed, your committee greatly misapprehend the message referred to them, if it does not shadow forth this very unusual second step in their charters, when it is recommended to give these turnpikes such aid, etc., as the condition of the public treasury may justify." Suppose, for the sake of argument, it should turn out that the money expended for the construction of the railroads in this State is a bad investment of capital, which the minority of the committee hope presently to prove is directly otherwise, does it necessarily follow, that turnpike roads, the utility and advantages of which have been tested and experienced by every State in the Union, north of this State, nor any other project of internal improvement, is ever to be again attempted within our borders? Hopeless, indeed, would be the condition of our Western brethren, who are, unquestionably, as much entitled to the fostering care of the legislature as any other portion of the people in the State,

if this is to be the fixed and settled policy for our future government. It is a policy, wholly and absolutely opposed to the enlightened age in which we live—the present advancement in civilization and improvement of the civilized world—and utterly inconsistent with the prosperity and happiness of the people of the State. If the principles of the majority report are to govern the future policy and destiny of the State, most degraded and miserable will be the condition of her people, in comparison with those of other States. With resources uncrippled, and an energy unsubdued, North Carolina will, in a few years, become the byeword of reproach and contumely throughout the length and breadth of our extended country. But a few years ago, and there was scarcely an enlightened and liberal man in the State who was opposed to a judicious system of internal improvement. What great and monstrous error has been committed on this subject within this State? What foolish, wasteful, and extravagant expenditure of public money has occurred to reduce and lower the tone of public sentiment in relation to internal improvement? The minority of the committee know of none whatever; and if the public feeling has undergone any material change on this subject, it must be referred to other and different causes. It is the misfortune of the age in which we live, that every thing, however useful and valuable, no way connected with federal politics, must be mixed up with the wretched party squabbles of the day, and nothing, however important to the welfare of the State, is allowed to escape this miserable contamination. And, in this regard, it is a melancholly reflection, that we are daily growing worse and worse. It was not the case a few short years ago, and the people must rouse up and cast off the fatal error, or there is too much cause to apprehend the most disastrous results. The necessity of judicious works of internal improvement has been long felt and acknowledged by the most enlightened and patriotic men of both the political parties which now divide the State. They have seen and felt this great necessity, and have, from time to time, urged upon the general assembly the adoption of needful measures to improve the condition of the State. If there be any thing erroneous or wrongful in this it is a wrong or an error common to both parties, and for which neither is alone responsible.

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The larger portion of the remainder of the majority report is devoted to building up a man of straw of their own creation, that they might have an opportunity of exhibiting their skill and dexterity in toppling it to the ground. Thus the majority assert, "that the treasury is in no condition to aid in the construction of turnpike roads, and that it is useless to investigate the value and cost of turnpikes across more than half the State, when it is known the State has no funds that can be applied in aid of their construction." "And furthermore, that the legislature ought not to tax the people, or borrow money for this purpose, if they could." Now all this flourish about taxing the people and borrowing money is entirely gratuitous. The message of the governor, contains no such recommendation, but on the contrary, it expressly advises the general assembly, "that whatever schemes of expenditure you may embark in, that you keep within the means at the command of the State; otherwise, the people must be taxed more heavily, or the State must contract a loan. The pressure of the times forbids the former; the tarnished honor of some of the States, should make us for the present, decline the latter." Although he has recommended that certain companies be incorporated to make turnpike roads, which are greatly needed to the west, and would most essentially promote the public welfare; yet the assistance, which he suggests may be given to such improvements at present, should be con-

fined to the means already set apart for internal improvement, and which under existing laws can be applied to no other object. These means consist of a cash balance on hand, and some bonds, which the majority states to amount to forty thousand dollars, and bonds given for the purchase of Cherokee lands, amounting to something less than three hundred thousand dollars; making the aggregate sum of about three hundred and forty thousand dollars. This fund, sooner or later, or a considerable portion of it, must be applied to the making of a turnpike road or roads to the west in aid of individual means and exertions, in some just proportion, perhaps on the two-fifths principle, or some other just ratio, between the State and individuals. A portion of these bonds applied towards the construction of turnpike roads in the western part of the State, when united with individual capital, would, like heaven-born charity, bless both giver and receiver. It would enable the obligees to these bonds, who gave more than double the value of the lands they purchased, to redeem them by the contribution of labor to make the roads, and at the same time, afford a fair return of profit in the shape of tolls on the investment. No time whatever, could be more propitious than the present to engage in such works, but for the fact, that in the present general distress and embarrassment, individuals could not now raise their portion of the means necessary to accomplish this desirable improvement; and therefore, for a time it must be postponed. The expenditure of two or three hundred thousand dollars in the Western portion of the State in the way suggested, where there is now existing an unexampled scarcity of money, would produce benefits, and be attended with advantageous results, which can hardly be described. But the minority have not time to enlarge upon them and must hasten to a conclusion.

It has been a matter of much mortification and surprise, to witness the senseless and inconsiderate clamor which has been raised against railroads, in almost every part of the State. They have been denounced as only calculated to benefit the rich, at the expense of the poor; that their construction has occasioned a heavy loss to the State, without any adequate return; and that, consequently, they deserve not the fostering care of the public. These charges and denunciations have been made and believed for the want of better information, and the minority will now undertake to disabuse the public mind from the deceptions and impositions under which it has labored. The first striking advantage resulting from railroads, is seen in the certainty and despatch with which persons and produce are conveyed on them. Persons travel on them at the rate of one hundred and fifty to two hundred miles in twelve hours, with as much safety as by any other mode of conveyance, and at a great saving of time and expense. The transportation of produce on them, although not quite so expeditious as the conveyance of persons, is yet five times more so than by wagons. This speedy transportation, always advantageous, is frequently of the utmost importance. A rise in the price of produce often takes place, which continues but for a short time, and it is very material that farmers and merchants should be in a situation to avail themselves of such a rise. A single example will sufficiently illustrate this advantage. During the last fall, the price of wheat in Petersburg opened at $1 12½ per bushel. In these times of low rates for all articles, this price was considered very good, and every one felt desirous of profiting by it, for it was forseen that it could continue but for a few weeks. A farmer and merchant in Granville, promptly availed himself of the railroad in his neighborhood, hastened his wheat to market, and obtained for it the price before mentioned; whereas, those who had to depend on the more tardy transportation by wagons, generally sold at but 75 cents per bushel. But a still more striking

and conclusive advantage, results from the great reduction effected in the expense of carrying produce to market. Previous to the construction of railroads in the neighborhood of the falls of Roanoke river, the price of wagoning cotton and other articles to Petersburg, was from 75 cents to $1 per hundred. The price now by railroads, is 25 cents per hundred, so that the saving to the grower of produce is, at the lowest estimate, twice as much as the freight per hundred on the railroad. Again, a merchant of much intelligence, in Raleigh, has furnished the minority with a statement, showing the rates formerly paid on the transportation of produce by wagons, to Petersburg, and the rates now paid by the railroad. From this statement it appears, that the price by wagons was from one to two dollars per hundred, the average being one dollar and fifty cents. The price now paid by the railroad for the same articles, is seventy cents, being a saving of more than one half of the former rate. By wagons, the price paid on salt was two dollars per sack; the price now paid by the railroad on the same article, is sixty-five cents, being a saving of double the amount now paid, by the railroad. The saving to the growers of produce, who send to market by the Wilmington and Raleigh railroad, has also been very great. These facts furnish some data on which to estimate the amount of saving to the agricultural interest in this State.

During the last year, the receipts on the Raleigh and Gaston railroad, amounted to, in round numbers,	$66,000	
Deduct one half of this sum, supposed to have been paid by passengers,	33,000	
And there will be left for freights on produce,		33,000
The receipts on the Wilmington and Raleigh railroad for the same time, amounted to,	230,000	
Allow one fifth part to have been received for freights on produce, is		46,000
The receipts on the Petersburg railroad, for the same period, were	174,000	
Supposing the receipts on produce on this road, sent from North Carolina, not included in the amount sent to that road from the Raleigh and Gaston road, to have been equal to one fourth of the whole receipts, and we have the sum of,		43,500
The receipts on the Portsmouth and Roanoke railroad, for the same time, were	70,000	
The portion collected for freights on produce from North Carolina, is estimated at one-fourth part, and will give the sum of,		17,500
The amount of freight then paid on produce from North Carolina, and supplies received in return, will be		140,000

The saving to the people by the cheaper transportation on railroads, is, as already shown, double the amount of freights, and the consequent saving per annum is two hundred and forty thousand dollars, and in two years and a half, is equal to the full subscription of six hundred thousand dollars, made by the State of North Carolina to the Wilmington and Raleigh railroad company. The minority of the committee cannot, nor do they venture to give the assurance, that the foregoing estimates are correct in all their parts; some may be too high, and others too low, but they have endeavored to approximate as near to accuracy as the information accessible to them allowed. Supposing, however, that the saving to the people by railroads should be

only one half the sum estimated, how much cause has the State, and those persons equally benefitted with stockholders, who have not shared in the heat and burden of the day, to be thankful for this great benefit, and how utterly groundless must be the vituperation and abuse which have been so lavishly heaped on railroads. So far from there being any just cause for this abuse, it is a fact undeniable by any candid man, that the people owe a debt of lasting gratitude to those spirited and enterprising citizens, who have effected such valuable improvements, in which rich and poor, according to the amount of their productions equally participate.

There is another important view of this subject, which seems to have been entirely overlooked or neglected. Even admitting that there may be no return of profit in the form of dividends on the capital invested in railroads, for some time to come, still this capital has not been lost to the State. Much the greater portion of it has been diffused and distributed more eqeally among the people, and has gone into the pockets of those who have furnished supplies of provisions, materials, and labor, for constructing the roads and still remains in the State, to benefit and bless hundreds and thousands.

The last part of the majority report remaining to be noticed, concerns so much of the governor's message as relates to an application to the general government to open a direct ship navigation between Albemarle sound and the ocean. If the recommendation contained in this part of the message should be adopted, the majority report seems to consider that the general assembly would place the State in the humble and degrading attitude of *begging* the general government for what it has not to give. Nothing can be more erroneous and unjust than this view of the subject. North Carolina asks nothing of the general government, but what she is authorized to demand as a matter of right. Thousands, hundreds of thousands, and millions of dollars, have been appropriated and expended in other States of the Union for similar objects, a large portion of which have, by no means, superior claims to the works proposed to be erected in this State. The State of North Carolina fully shares with her sister States in the burthens of the general government, and why should she not also participate equally with others in its benefits? But this subject has been so satisfactorily examined in a short report, by a member of the minority, whose constituents are more immediately interested, hereto annexed, that nothing further will now be added by the minority.

A. Joyner,
Jon. H. Jacocks,
Alfred Dockery.

AMERICAN MECHANICAL SKILL.

We find in the report of the Judges of the Twelfth Annual Exhibition of the Franklin Institute, several notices of mechanical skill, which are highly creditable to the exhibitors. From all the rest we have selected three which appeared most interesting.

The first is in reference to a theodolite constructed with a view to obviate by a simple contrivance, a disadvantage frequently noticed in the construction of the vernier—its success, however, we doubt, as the risk of inaccuracy appears to be considerable.

The clock spoken of, was presented at the American Institute fair in this city, and to us appeared one of the most original and ingenious contrivances in the whole exhibition. The award of the committee in this case was well bestowed.

The transit, by Mr. Wm. J. Young, also deserves notice as being new evidence of the competency of intelligent American mechanics to compete with the best workmanship, the world can produce.

No. 224, theodolite, made by Edmund Draper. This useful instrument presents a specimen of excellent work, and is of the most approved construction. The verniers are supported on a hinge, so as to rest on the graduated limb with little force, and to move over it with little friction, and thus to prevent the abrasion which is often observed.

No. 356, clock of a new construction, by A. D. Crane. The regulating power of this curious clock is neither a pendulum, nor a balance; but a globe of brass is hung to the end of a long flat steel wire, which, being twisted round in one direction, is untwisted by the weight of the globe and its own elasticity, and wound round in the opposite direction, and so on alternately. At each of these movements, an appendage at the upper end of the wire acts upon an escapement of a peculiar construction, so arranged as to be nearly frictionless, but of which it would be difficult to give an intelligible description in this report. Although this revolving pendulum is no longer than that of an ordinary mantel clock, each revolution of the globe occupies half a minute; so that the movement of the clock may be maintained for a much longer time than in those in which the escapement is acted upon every second or half second. Accordingly, the clock sent to the exhibition is said to be capable of going an entire year, without requiring to be wound up. The committee look upon this as a new and interesting instrument, and recommend it as worthy of the award of a silver medal.

No. 872, transit or meridian circle, made by Wm. J. Young. This remarkable instrument is a most successful example of the highest class of mechanical skill. It is an exact copy of a meridian circle made by Ertel and Sons, at Munich, and now at the High School observatory in Philadelphia. A description of it cannot be introduced into this report; but the committee have pleasure in expressing their belief that it is the most perfect, as well as the most difficult, work of the kind ever executed in this country, and, as such, they recommend that it have the award of a silver medal.

Cast Iron Buildings.—A correspondent of the Times says:—"Buildings of cast-iron are daily increasing, at a prodigious rate, in England, and it appears that houses are about to be constructed of this material. It is proposed that the walls shall be hollow, so that the whole house may be heated by a single stove in the kitchen. A three-story house, containing ten or twelve rooms, will only cost about £1000; and it may be taken to pieces, and removed to another place, at an expense of about £25. It is understood that a large number are about to be manufactured, to be sent to Hamburg, for those persons who have had their habitations burnt."—*London Atheneum.*

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